REMARKS/ARGUMENTS

General:

Claims 1-5, 9-18, and 21-26 are pending in the application after this amendment. Claims 1, 11, 12, 18, and 21 are amended, and claims 6-8, 19, and 20 are canceled. Claims 22-26 are newly added.

No new matter has been added by these amendments.

Rejection under 35 U.S.C. § 102:

Claims 1-5, 10-14, and 16-18 were rejected as anticipated by U.S. patent 4,808,824 (Sinnar). Sinnar describes a system for monitoring icing and de-icing of an aircraft. Sinnar's system relies on a test beam 32 and a reference beam 34, each at two different frequencies, being directed to a test detector 50 and a reference detector 60. Test detector 50 and reference detector 60 are designed to be located near each other in close proximity to a surface whose condition is to be monitored for onset of ice formation. *See col.* 3, *ll.* 48-51 and *col.* 3, *ll.* 54-55. Sinnar starts from the assumption that when the test surface 49 is clean the test signal and the reference signal will be identical. "Detection of a difference between the outputs of test detector 50 and reference detector 60 indicates the presence of moisture and/or ice." *Col.* 4, *ll.* 31-33. Only once it is established that "moisture and/or ice" is present does Sinnar use a comparison of the different frequencies to determine *which* coating, water, ice, glycol, or a mixture, is present on the test surface. This makes perfectly good sense for Sinnar, who can provide a test surface 49 artificially constructed to act as a test surface, and assume that the ice or water on the test surface is representative of the ice or water on the adjacent wing. Sinnar never inspects the actual wing, only the proxy test surface. Further, Sinnar mounts the light source, test surface, and detector in a rigid alignment, and can thereafter ignore issues of relative position.

The present invention, in contrast, is concerned with inspecting the actual base material to determine which *portions* of the base material may be covered with the second material. Furthermore, the invention is primarily concerned with arthroscopic or endoscopic surgery (see paragraph [0066]), where there are two additional difficulties not faced by Sinnar. First, the target base material is typically bone *in vivo* (see paragraphs [0063] and [0067]). It is simply not possible to provide a reference target matched to the properties of "clean" bone in an actual

patient in an actual clinical setting. In addition, living bone is a material that has variable properties, and is likely to be occluded with debris of other bodily materials. Furthermore, the angle and distance of the bone surface from the light source and detector will vary over a wide range. Second, in arthroscopic surgery, the device is necessarily movable, the surgeon does not always have a clear view of the worksite, and because of parallax and other problems, the infrared detector may not be aimed where the surgeon believes that it is aimed, and may not be aiming at bone at all. Sinnar's system, in which the presence of a coating on the test surface is determined by a difference between the test signal and the reference signal from separate detectors attached to a surface to be monitored, without the drawbacks facing *in vivo* measurement of bone tissue, is completely inapplicable to the present invention.

The present invention, as now claimed in claims 1, 11, and 12, provides a system and method in which the difference between the absorptions of the two test beams is used to determine whether the coating material or the bare base material is being detected by comparing the absorption of two different frequencies, where the difference in absorption of the two frequencies is different for the base material and the second material or substance. There is no disclosure or suggestion in Sinnar of such a system or method. Sinnar never considers, or even cares about, the absorption of the base material, because Sinnar uses matched test and reference targets. In effect, Sinnar's system cancels out the base material and is, therefore, independent of whatever base material is used.

Claim 11 further recites that the base material absorbs the first and second wavelengths more equally than the other substance. There is no suggestion of this feature in Sinnar, in which the absorption characteristics of the base material are never discussed, because they do not matter.

Furthermore, to the extent that the present invention is directed to arthroscopic surgery, it is respectfully submitted that Sinnar is non-analogous art. The examiner has not shown that a person of ordinary skill, seeking to solve a problem of removing old cement from bone in an arthroscopic surgery setting, would reasonably be expected or motivated to look to the de-icing of aircraft for guidance. *See, In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992), cited at MPEP § 2141.01(a).

The invention as now claimed in claims 1, 11, and 12 is both new and non-obvious over Sinnar.

Claims 2-5, 10, 13-14, and 16-18 are dependent from claim 1 and, without prejudice to their individual merits, are believed to be allowable over Sinnar for the same reasons as claim 1. With reference to claim 2, however, it is respectfully submitted that Sinnar does not teach the specific sequence of comparisons recited in claim 2. All four signals are fed into the microcomputer 70 (as best seen in Fig. 2), and Sinnar does make some comparison between test and reference beams, *see col.* 4, *ll.* 31-32, and *col.* 5, *ll.* 31-34, but nowhere does Sinnar disclose whether his system generates and compares difference values or uses some other formula.

For the foregoing reasons, the rejection of claims 1-5, 10-14, and 16-18 as anticipated lacks foundation. Withdrawal of the rejection and allowance of claims 1-5, 10-14, and 16-18 is requested.

Rejection under 35 U.S.C. § 103:

Dependent claims 6-9, 15, and 19-21 were rejected as obvious over Sinnar in view of EP 1 048 265 (V.Lilienfeld-Toal). It is noted that V.Lilienfeld-Toal is relied on only as showing the additional feature of claims 6 and 15, namely, a quantum cascade laser. Claims 6-8 and 19-20 are canceled. Without prejudice to their individual merits, claims 9, 15, and 21 are deemed allowable over the combination of Sinnar and V.Lilienfeld-Toal for the same reasons as their respective base claims are deemed allowable over Sinnar alone. In addition, however, with respect to claims 9 and 21 the examiner cites Figs. 3A and 3B of Sinnar as showing a wavenumber of approximately 1750 cm^{-1}. The examiner is respectfully requested to reconsider the calculation of the wavenumbers of the radiation in Sinnar. Figs. 3A and 3B of Sinnar cover the range from 1 μm to 2 μm wavelength. One micrometer is one ten-thousandth of a centimeter, so Sinnar's range corresponds to a wavenumber of 10,000 to 5,000 cm^{-1}. A wavenumber of 1750 cm^{-1} is about 5.71 μm (see paragraph [0067]), which is far outside Sinnar's range.

At least because claims 9, 15, and 21 depend from allowable claims, they are deemed allowable. Applicant requests withdrawal of the rejection and allowance of claims 9, 15, and 21.

New claims:

Claims 22 and 25 are directed to the feature of directing the radiation at a plurality of inspection sites on the surface being inspected. This enables the surface of the base material to be scanned. Basis for this feature is present, for example, in paragraph [0065], last sentence. There is no disclosure or suggestion of this feature in Sinnar where, as noted above, the light source and detector are fixed in alignment with the artificial test surface 49. Indeed, because of that, Sinnar's system does not permit the surface being monitored to be scanned.

Claims 23, 24, and 26 are directed to the feature of removing one of the two materials by selective removal where the inspection indicates that the material to be removed is exposed. Basis for this feature is found in paragraph [0066]. There is no disclosure or suggestion of this feature in Sinnar where, as noted above, the fixed test surface 49 is used as a proxy for the entire wing, or indeed the entire aircraft, and treating individual areas is not an option.

Newly presented claims 22-26 are both new and non-obvious over the cited references, and their allowance is requested.

CONCLUSION

In view of the foregoing, reconsideration of the Examiner's rejections and allowance of all claims 1-5, 9-18, and 21-26 as amended herein are earnestly solicited.

If the Examiner believes that direct communication with Applicant's representative will help advance this application, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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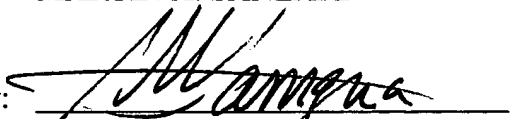
By: 

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